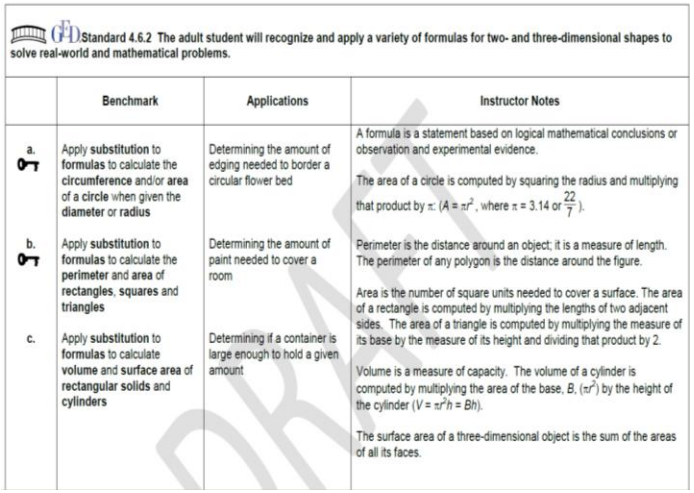
Using the Standards . . . Ideas from the Field

Instructor Guide



Standard 4.6.2 The adult student will recognize and apply a variety of formulas for two- and three-dimensional shapes to solve real-world and mathematical problems.

	Benchmark	Applications	Instructor Notes
a.	Apply **substitution** to **formulas** to calculate the **circumference** and/or **area** of a **circle** when given the **diameter** or **radius**	Determining the amount of edging needed to border a circular flower bed	A formula is a statement based on logical mathematical conclusions or observation and experimental evidence. The area of a circle is computed by squaring the radius and multiplying that product by π: ($A = \pi r^2$, where $\pi = 3.14$ or $\frac{22}{7}$).
b.	Apply **substitution** to **formulas** to calculate the **perimeter** and **area** of **rectangles**, **squares** and **triangles**	Determining the amount of paint needed to cover a room	Perimeter is the distance around an object; it is a measure of length. The perimeter of any polygon is the distance around the figure. Area is the number of square units needed to cover a surface. The area of a rectangle is computed by multiplying the lengths of two adjacent sides. The area of a triangle is computed by multiplying the measure of its base by the measure of its height and dividing that product by 2.
c.	Apply **substitution** to **formulas** to calculate **volume** and **surface area** of **rectangular solids** and **cylinders**	Determining if a container is large enough to hold a given amount	Volume is a measure of capacity. The volume of a cylinder is computed by multiplying the area of the base, B, (πr^2) by the height of the cylinder ($V = \pi r^2 h = Bh$). The surface area of a three-dimensional object is the sum of the areas of all its faces.

Use the standards and benchmarks:

- to create syllabi and authentic lesson plans
- to select appropriate curriculum
- to ensure that material has been covered
- to develop instructor-made assessments

Use the applications:

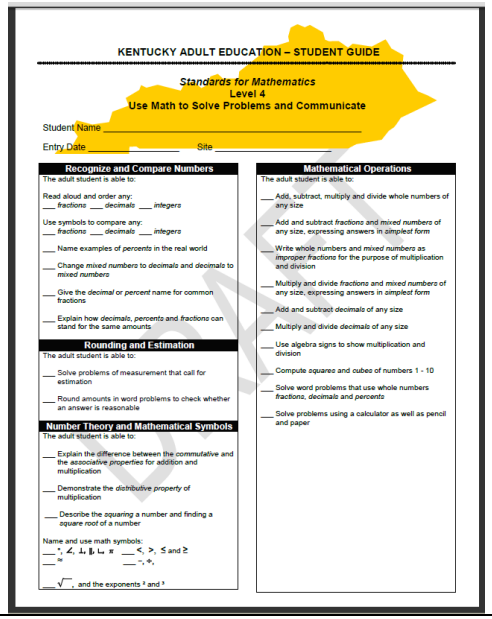
- to develop lessons and activities that use real-life materials
- as a springboard for discussions of other real-life scenarios where the benchmark might be used
- to create games or activities around real-life situations
- as icebreakers

Use the Instructor Notes:

- as supplemental information
- for instructional tips

Practical Suggestion: Place the instructor guide with lesson plans in a notebook

Student Guide



KENTUCKY ADULT EDUCATION – STUDENT GUIDE

Standards for Mathematics
Level 4
Use Math to Solve Problems and Communicate

Student Name _____

Entry Date _____ Site _____

Recognize and Compare Numbers

The adult student is able to:

Read aloud and order any:
___ *fractions* ___ *decimals* ___ *integers*

Use symbols to compare any:
___ *fractions* ___ *decimals* ___ *integers*

___ Name examples of *percents* in the real world

___ Change *mixed numbers* to *decimals* and *decimals* to *mixed numbers*

___ Give the *decimal* or *percent* name for common *fractions*

___ Explain how *decimals*, *percents* and *fractions* can stand for the same amounts

Rounding and Estimation

The adult student is able to:

___ Solve problems of measurement that call for estimation

___ Round amounts in word problems to check whether an answer is reasonable

Number Theory and Mathematical Symbols

The adult student is able to:

___ Explain the difference between the *commutative* and the *associative properties* for addition and multiplication

___ Demonstrate the *distributive property* of multiplication

___ Describe the *squaring* a number and finding a *square root* of a number

Name and use math symbols:
___ °, ∠, ⊥, ∥, ∟, π ___ <, >, ≤ and ≥
___ ≈ ___ –, ÷,
___ √‾, and the exponents ² and ³

Mathematical Operations

The adult student is able to:

___ Add, subtract, multiply and divide whole numbers of any size

___ Add and subtract *fractions* and *mixed numbers* of any size, expressing answers in *simplest form*

___ Write whole numbers and *mixed numbers* as *improper fractions* for the purpose of multiplication and division

___ Multiply and divide *fractions* and *mixed numbers* of any size, expressing answers in *simplest form*

___ Add and subtract *decimals* of any size

___ Multiply and divide *decimals* of any size

___ Use algebra signs to show multiplication and division

___ Compute *squares* and *cubes* of numbers 1 - 10

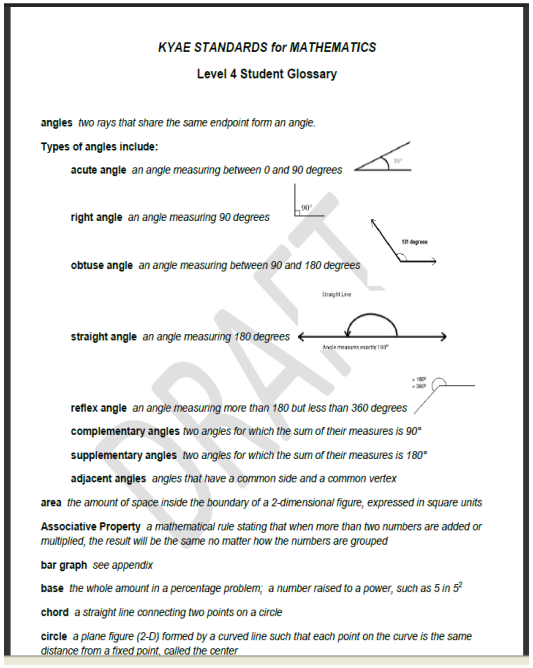
___ Solve word problems that use whole numbers *fractions*, *decimals* and *percents*

___ Solve problems using a calculator as well as pencil and paper

Use the appropriate student guide:

- to debrief TABE results (check areas that need attention, highlight areas that were correct as encouragement)
- as a checklist of student's short-term goals, part of the individual learning plan
- as a curriculum building tool
- as a resource in the student folder so any instructor can see what has been accomplished and what still needs to be learned
- to guide homework assignments
- to develop an end of class review
- as a checklist for students to track individual progress; an evaluation tool for them to reflect on progress with a staff member and determine when ready to progress to the next level class
- to discuss activities with the student that would help them understand a concept: student-generated activities
- to determine student readiness for a progress test, the GED® Tests, etc.
- as an instrument to fax information when students move from county to county
- as an exit slip to move from one class into the next level class
- as a quick guide for substitute teachers

Student Glossary



KYAE STANDARDS for MATHEMATICS

Level 4 Student Glossary

angles *two rays that share the same endpoint form an angle.*

Types of angles include:

acute angle *an angle measuring between 0 and 90 degrees*

right angle *an angle measuring 90 degrees*

obtuse angle *an angle measuring between 90 and 180 degrees*

straight angle *an angle measuring 180 degrees*

reflex angle *an angle measuring more than 180 but less than 360 degrees*

complementary angles *two angles for which the sum of their measures is 90°*

supplementary angles *two angles for which the sum of their measures is 180°*

adjacent angles *angles that have a common side and a common vertex*

area *the amount of space inside the boundary of a 2-dimensional figure, expressed in square units*

Associative Property *a mathematical rule stating that when more than two numbers are added or multiplied, the result will be the same no matter how the numbers are grouped*

bar graph *see appendix*

base *the whole amount in a percentage problem; a number raised to a power, such as 5 in 5^2*

chord *a straight line connecting two points on a circle*

circle *a plane figure (2-D) formed by a curved line such that each point on the curve is the same distance from a fixed point, called the center*

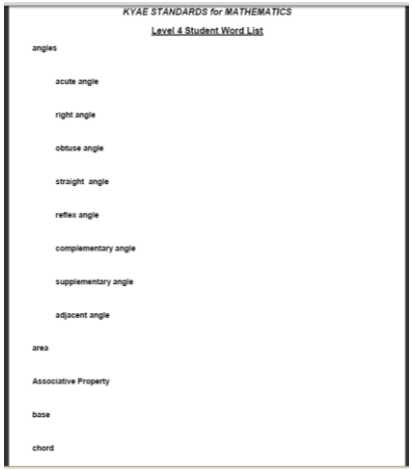
Use the appropriate level student glossary:

- as a tool for instructors when developing vocabulary lessons/activities
- as a student reference tool for actual math work
- with students as a word bank or a quiz
- to teach how/when to use a glossary
- as an informal assessment of student knowledge, using a highlighter to designate mastered terminology
- to introduce a new topic
- to make into a big poster for classroom display
- to encourage peer-to-peer teaching activities
- to discuss real-life applications, e.g. Where would you find an acute, right or obtuse angle?
- to create crossword puzzles of chosen terms, e.g. give the definition as the clue and have the student supply term as the answer
- as a source for the development of matching activities, math jeopardy or math bingo games
- Take a defined word and create math problems, e.g. figuring the perimeter of the classroom

Practical Suggestions:

- Enhance the glossary with color to draw attention to certain concepts
- Laminate the glossary on colored paper for each student
- Use Web sites, e.g. http://puzzlemaker.discoveryeducation.com, to create original puzzles

Student Word List



KYAE STANDARDS for MATHEMATICS

Level 4 Student Word List

angles

acute angle

right angle

obtuse angle

straight angle

reflex angle

complementary angle

supplementary angle

adjacent angle

area

Associative Property

base

chord

Use the student word list:

- to create a word wall, puzzles, etc.
- to integrate math vocabulary with reading and writing, e.g. using math words in sentences
- as a spelling list
- to have students look up definitions or write their own
- to match words with meanings
- in discussion of real world applications, e.g. have students write 2 examples for each word – where it might be used
- with word problems recognizing terms from the list
- to develop a matching game incorporating drawings in relation to words
- to introduce math skills through word recognition, word meaning and vocabulary application
- to build vocabulary skills for increasing skills in reading math problems
- as a check list for terms covered in class

Word Boxes

acute angle	right angle
obtuse angle	straight angle
reflex angle	complementary angle
supplementary angle	adjacent angle
area	Associative Property

Use the word boxes:

- to create learning stations
- to create a word wall
- to create a jeopardy game, e.g. present the term, having the student come up with the question
- as flash cards- teacher/student or student/student
- as a concentration game (match the words to an example)
- as matching exercises
  - word to definition or a visual/example
  - a math problem to a word
  - match a math symbol to a word
  - match word cards to visual aids
- to create a word search or crossword puzzle
- as pictograph flash cards

Teaching Suggestions:

- Give students a spiral index card notebook to record a new word each day with its definition and symbol
- Have students draw a picture under the word and write a definition on the back
- Use Web sites, e.g. http://puzzlemaker.discoveryeducation.com, to create original puzzles